

Catalytic Hydrocondensation of Carbon Monoxide With Olefins and Their Hydropolymerization Under the Action of Carbon Monoxide and Hydrogen. Report 29. The Behavior of 2,4,4-Trimethylpentene-1 Toward Hydrocondensation Catalysis

S/062/60/000/011/010/016
B013/B078

the action of 63% sulfuric acid. The experimental conditions and results obtained are given in Tables 1 and 2 and graphically represented in Fig.1. The results indicate that 2,4,4-trimethylpentene-1 in the absence of H_2 and CO changes only slightly on the CO clay catalyst at 190°C and atmospheric pressure. A partial shift of the double bond takes place, resulting in an isomerization of 2,4,4-trimethylpentene-2. In mixtures with H_2 , 2,4,4-trimethylpentene-1 is hydrogenated up to 2,2,4-trimethylpentane, the degree of hydrogenation depending upon the H_2 excess of the vapor - gas mixture used. Simultaneously, hydrocracking and disproportionation with respect to the molecular weight take place (Ref.8). If the mixture contains chiefly olefin, the reactions will only occur to a limited extent: The maximum content of C_5-C_7 hydrocarbons amounts to 5% in the catalyzate, and that of C_9 and above is 5.5% at

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most. With an H_2 excess the yield of C_5-C_7 increases. But even at a ratio of $H_2/C_8H_{16} = 13.5$ it does not exceed 19%. The yield of skeleton isomerization products does not exceed 7-8%. If CO is added to the mixture, hydrocondensation of CO with diisobutylene takes place. At a CO content of 5-6% in the mixture, it does not exceed ~10%. Simultaneously, the original olefin is hydrated up to isooctane at 40-50%. The yield of C_5-C_7 amounts to 10-14%. If the CO content is increased to 8-9%, hydrocondensation will not take place at all. Hydrogenation does not exceed 10-20%. The yield of liquid cracking products amounts to 10%. There are 1 figure, 2 tables, and 8 Soviet references.

ASSOCIATION: Institut organicheskoy khimii im. N. D. Zelinskogo
 Akademii nauk SSSR (Institute of Organic Chemistry
 imeni N. D. Zelinskiy of the Academy of Sciences USSR)

SUBMITTED: June 22, 1959

Card 3/3.

RYDUS, Ya.T., NEFEDOV, B.K.

Polymerization of isobutylene. Usp.khim. 29 no.7:833-863 J1 '60.
(MIRA 13:7)

1. Institut organicheskoy khimii im. N.D. Zelinskogo AN SSSR.
(Propene) (Polymerization)

S/062/60/000/008/025/033/XX
B013/B055

AUTHORS: Yerшов, N. I., Yerokhina, V. R., and Eydua, Ya. T.
TITLE: Catalytic Isomerization of Cyclopropane in Mixtures With Olefins
PERIODICAL: Izvestiya Akademii nauk SSSR. Otdeleniye khimicheskikh nauk, 1960, No. 8, pp. 1495-1499

TEXT: In the present paper, the authors studied the effect of admixing cyclopropane to ethylene and propylene on their polymerization over various catalysts. Cyclopropane was prepared by the method described by G. G. Gustavson (Ref. 11). Quantitative determination of the propylene and cyclopropane mixtures was carried out by a method based on the selective absorption of propylene in a KI-Br₂ solution (Ref. 13). The apparatus and experimental technique was the same as in Ref. 15. The following catalysts were applied: Cobalt on alumina (Ref. 16) (I), silica gel (II), cobalt/silica gel (III), aluminum silicate (IV), and cobalt/aluminum silicate (V). On catalyst (I), neither ethylene nor propylene formed liquid polymerization products at 300°C and below. Addition of cyclopropane (7 - 30%) to

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ethylene produced only slight formation of liquid polymerizates. The yield was less than 1% of the initial ethylene and 9 - 43% of the added cyclopropane. The latter was isomerized only up to 20% (Table 1). In experiments with propylene (Table 2), the portion of reacted cyclopropane was lower (5 - 15%). The data listed in the table show that liquid polymerizates are formed in small quantities, or not at all, when cyclopropane is added to ethylene or propylene. The cyclopropane is isomerized only slightly, only up to 20%. In the presence of hydrogen, the yields of liquid hydropolymerizates of ethylene, obtained with and without addition of cyclopropane, did not exceed 4.1% of the initial alkene. The addition of cyclopropane did not affect the yield. 33 - 57% of the cyclopropane entered into reaction, i.e., a much higher percentage than in the absence of hydrogen. No liquid polymerizates were formed in experiments employing catalysts containing silica gel, (II) and (III). Neither propylene polymerization nor cyclopropane isomerization occurred. In tests employing catalysts of propylene polymerization which are based on synthetic aluminum silicate, the cyclopropane in mixture with olefins is isomerized 65 - 100%. It was stated that no final conclusions concerning the polymerizing effect of cyclopropane admixtures could be drawn from the experimental data, since the yields of liquid polymerizates were lower than

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the amount of reacted cyclopropane. It was, however, possible to determine the activity of the various catalysts. Catalysts containing aluminum silicate were found to be very active in isomerization of cyclopropane in mixtures with ethylene and propylene. Cobalt on alumina was much less efficient. There are 4 tables and 22 references: 12 Soviet, 10 US, 4 British, 7 German, and 1 French.

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SUBMITTED: March 9, 1959

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87449
S/081/60/000/022/016/016
A005/A001

Translation from: Referativnyy zhurnal, Khimiya, 1960, No 22, p. 571, # 91091

53830 2209
AUTHORS: Eydas, Ya. T., Yershov, N. I.

TITLE: On the Role of the Plane Chains in the Catalytic Hydropolymerization Mechanism of Olefins Under the Action of Small Quantities of Carbon Monoxide in the Presence of Hydrogen

PERIODICAL: Probl. kinetiki i kataliza, 1960, Vol. 10, pp. 404-409

TEXT: The radical-chain mechanism is proposed of the heterogeneous-catalytic al hydropolymerization reaction of olefins under the action of small CO-quantities in H₂-presence, proceeding in contact with a cobalt catalyst at about 200°C and atmospheric pressure. In the process mechanism are included the reactions of the H-atoms and radicals connected with the surface, their recombinations and dissociations and the interactions with the absorbed olefin molecules. X

A. Litmanovich

Translator's note: This is the full translation of the original Russian abstract.

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S/079/60/030/011/018/026
B001B055

AUTHORS: Eydus, Ya. T., Puzitskiy, K. V., and Sterligov, O. D.

TITLE: Acid-catalyzed Synthesis of Esters and Other Derivatives of Carboxylic Acids From Carbon Monoxide, Olefins, and Compounds Capable of Acylation. IV. Carbomethoxylation of Amylenes of Different Structures

PERIODICAL: Zhurnal obshchey khimii, 1960, Vol. 30, No. 11, pp. 3799-3802

TEXT: The present publication is an investigation on the carbomethoxylation of the following isomeric amylenes by a method developed by the authors in earlier studies (Refs. 1-4): 1-pentene, 3-methyl 1-butene, 2-methyl 1-butene, and 2-methyl 2-butene. As in the earlier papers (Refs. 1-4), the reaction of the olefin, carbon monoxide and catalyst (concentrated H_2SO_4) in the first stage of the reaction, which involves formation of acyl sulfuric acid as intermediate, proceeded at an initial CO pressure of 80 atm and at temperatures of 20 - 40°C. Addition of methanol to the reaction mixture transforms the acyl sulfuric acid into its methyl ester in the second stage

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of the reaction. Methyl esters were obtained from 1-pentene in 54% yield, and from the branched amylenes in 64 - 69% yields, as calculated for initial olefin. 2-Methyl 2-butene gave the highest yield (69%). Methyl-1,1-dimethyl butyrate was obtained as the main reaction product from all isomeric amylenes. The mixture of esters from 1-pentene contained 50.5% of this ester, that from 3-methyl 1-butene 61%, from 2-methyl 1-butene 45%, and from 2-methyl 2-butene 35%. The structures of the remaining reaction products varied according to whether the initial compound had been n-amylenes or branched amylenes. In analogy to the results obtained with 1-hexene and 1-heptene, 1-pentene yielded methyl-1-ethyl butyrate, as second reaction product, which constituted 27.5% of the ester mixture obtained. Methyl-1-ethyl butyrate was not detected among the reaction products from branched amylenes, which are partly transformed to methyl-trimethyl acetate (4 - 10%), 1,1-dimethyl valeric acid (0 - 5%), and higher acids (30 - 50%). There are 1 figure, 2 tables, and 16 references:

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of Different Structures

6 Soviet, 4 US, 1 British, 3 German, 1 Italian, and 1 French.

ASSOCIATION: Institut organicheskoy khimii Akademii nauk SSSR (Institute
of Organic Chemistry of the Academy of Sciences USSR)

SUBMITTED: December 18, 1959

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87169

53839

2209, 1274, 1153

S/062/60/000/012/012/020
B013/B054

AUTHORS: Eydus, Ya. T. and Nefedov, B. K.

TITLE: Catalytic Hydrocondensation of Carbon Monoxide With Olefins. Report 30. Effect of the Component Ratio of the Initial Mixture on the Hydropolymerization Process of Isobutylene Under the Simultaneous Action of Hydrogen and Carbon Monoxide

PERIODICAL: Izvestiya Akademii nauk SSSR. Otdeleniye khimicheskikh nauk, 1960, No. 12, pp. 2221-2229

TEXT: The authors studied the dependence of the hydropolymerization process of isobutylene on the CO content and the ratio $i-C_4H_8 : H_2$ in the ternary $i-C_4H_8 - H_2 - CO$ mixture. They used the same apparatus and methods as in Ref. 7. Co on clay served as a catalyst (Ref. 2). The reaction was conducted at atmospheric pressure, $190^{\circ}C$, and a volume velocity of the used gas of $\sim 100 \text{ h}^{-1}$. It was found that mainly a destructive hydro-polymerization of isobutylene took place at a CO content of up to 5% and

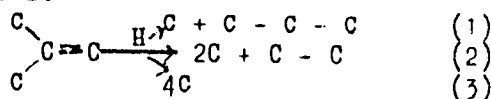
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a ratio $i-C_4H_8 : H_2 = 1 - 2$, while the real polymerization of isobutylene occurred at $i-C_4H_8 : H_2 = 3$. In the range of a CO concentration between 7 and 20%, the synthesis according to Fischer-Tropsch mainly occurs. It is assumed that the primary reaction during destructive hydropolymerization of isobutylene is its destructive hydrogenation. A consequence is the formation of reactive alkyl radicals which, for their part, react with the not decomposed isobutylene molecules to form 2-methyl alkanes and corresponding olefins. The destructive hydrogenation processes are the more intense and deep-reaching, the higher the concentration of hydrogen on the catalyst surface is. It evidently decreases with increasing CO- and $i-C_4H_8$ contents in the used gas. The processes can be schematically represented as follows:



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In the absence of CO and at a ratio $i-C_4H_8 : H_2 = 1-2$, mainly radicals
with one, rarely with two, carbon atoms are formed due to the destruction
of isobutylene. The further reaction may proceed according to the

following scheme: $C - \underset{\underset{C}{|}}{C} - C \xrightarrow{C} C - \underset{\underset{C}{|}}{C} - C - C \rightarrow C - \underset{\underset{C}{|}}{C} - C - C - C$ (4),

$C - \underset{\underset{C}{|}}{C} - C \xrightarrow{C-C} C - \underset{\underset{C}{|}}{C} - C - C - C$ (5). Mainly 2-methyl butane, 2-methyl

pentane, and corresponding olefins are formed. On addition of smaller CO
amounts, radicals with one carbon atom are formed, presumably of the same
character, according to the scheme: $CO + 2H_2 \rightarrow CH_2 + H_2O$. Besides, the
decomposition of isobutylene according to scheme (1) is intensified on
addition of CO. Liquid hydrocarbon yields increase, and higher-molecular

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2-methyl alkanes are formed. At large CO amounts, isobutylene evidently decomposes according to scheme (1) only. A considerable part of the radicals with one C atom is formed at the expense of carbon monoxide hydrogenation. As under these conditions only few isobutylene molecules are on the catalyst surface, radicals react with each other by realizing the synthesis according to Fischer-Tropsch. The presence of numerous radicals with three carbon atoms, which formed according to scheme (1), leads to the formation of hexane, the presence of CH_2 radicals to the formation of heptane. The latter can be formed according to the bridge scheme $2\text{C} - \text{C} - \text{C} + \text{C} \rightarrow \text{C} - \text{C} - \text{C} - \text{C} - \text{C} - \text{C} - \text{C}$ suggested in Ref. 11. The formation of various hydrocarbons obtained in the experiments can be explained on the basis of the schemes given. Table 1 shows the composition of the gas mixtures used and the properties of the resulting hydropolymerizates. Figs. 1 and 2 show the distillation curves for the hydrogenated hydropolymerizates. Tables 2-9 give the resulting principal

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B013/B054

fractions. Table 10 gives comparative data from publications. Table 11 shows the yields in liquid hydrocarbons for the mixtures 1-5. There are 3 figures, 11 tables, and 11 Soviet references.

ASSOCIATION: Institut organicheskoy khimii im. N. D. Zelinskogo Akademii nauk SSSR (Institute of Organic Chemistry imeni N. D. Zelinskiy of the Academy of Sciences USSR)

SUBMITTED: June 22, 1959

Card 5/5

81720

S/020/60/133/01/30/070

B011/B003

5.3831

AUTHORS: Yershov, N. I., Eydu, Ya. T., Yerokhina, V. P.

TITLE: Oxygen-initiated Polymerization of Ethylene¹ by Heterogeneous Catalysis in the Presence of Hydrogen

PERIODICAL: Doklady Akademii nauk SSSR, 1960, Vol. 133, No. 1, pp. 108-111

TEXT: In a preceding investigation (Ref. 1) the authors have found that ethylene is polarized on a Co-clay catalyst during hydrogenation at 100°C. So far, such a polymerization had not been observed if the gas did not contain CO impurities. It was proved that polymerization at 100°C is not initiated by CO but by oxygen. This reaction is reduced by a rise in temperature, and is most vigorous between 100 and 120°C. It is additionally intensified by an increase in the oxygen content up to 2%. It does not take place in the absence of oxygen and hydrogen. In the article under review, the authors report on some results of this new reaction named in the title. The same apparatus and catalyst were used as in Refs 1 and 2. Table 1 lists the experimental results obtained at

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a ratio of 1:3.2 between C_2H_4 and H_2 . It may be seen that polymerization yields a gaseous dimer and up to 35% of liquid products (referred to the ethylene used). The waste gas contains 1-1.5% of CO. The authors assume that the said reaction is identical with the hydropolymerization of ethylene under the action of CO (Ref. 2). This was, however, not the case since the reaction did not give the highest yield between 190 and 200°C and was not intensified with rising CO concentration. Table 2 proves that this is the case with $C_2H_4 : H_2 = 1.1$ and an O_2 content of 2%. At the same time, the ethane yield rises from 45 to 79%. Experimental results obtained at different temperatures, which show the effect of CO addition upon polymerization and hydrogenation, are given in Table 3. The presence of CO and H_2O_2 in the waste gas and the reaction water of several experiments indicate that O_2 added to the reaction mixture reacted vigorously with the main components during the reaction. The authors assume that active surfaces are thus formed, which initiate the polymerization of ethylene. This is proved by the increasing quantity of

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reaction products with rising O_2 content at $100^\circ C$. From all this the authors conclude that the reaction named in the title is initiated by O_2 . The polymerization of ethylene in the presence of H_2 is not identical with the hydropolymerization under the action of CO. There are 1 figure, 3 tables, and 4 references: 3 Soviet and 1 German.

ASSOCIATION: Institut organicheskoy khimii im. N. D. Zelinskogo
Akademii nauk SSSR (Institute of Organic Chemistry imeni
N. D. Zelinskiy of the Academy of Sciences, USSR)

PRESENTED: March 10, 1960, by B. A. Kazanskiy, Academician

SUBMITTED: March 8, 1960

Card 3/3

87407

S/020/60/135/006/023/037
B016/B060

11.1210

AUTHORS: ~~Evdus, Ya. T.~~, Nafedov, B. K., Yakovlev, I. P., and
Lobzova, A. V.

TITLE: Alkylation of Cyclohexene Under Conditions of the Reaction
of the Destructive Isobutylene Hydropolymerization

PERIODICAL: Doklady Akademii nauk SSSR, 1960, Vol. 135, No. 6,
pp. 1409-1412

TEXT: The authors describe their experiments in alkylating cyclohexene
admixed to an isobutylene-hydrogen mixture. Apparatus and methods were
the same as those used in previous experiments (Ref. 1). Preliminary ex-
periments were conducted with the mixtures: cyclohexene - hydrogen
(results in Table 1, experiments 1 and 2), and isobutylene - hydrogen
(experiments 4 and 6). The following conclusions were drawn from results:
cyclohexene is chiefly hydrogenated to cyclohexane in the presence of
hydrogen at 190°C and atmospheric pressure at the Co-clay catalyst, and is
catalyzed irreversibly. Cyclohexene is to a certain degree alkylated by
the CH₂ radicals resulting from its hydro-cracking. In the presence of

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isobutylene and hydrogen, cyclohexene is by 3.5 to 4 times more strongly alkylated than it would be in a mixture with hydrogen only. It is therefore concluded that isobutylene offers an additional alkylation source and the authors' former scheme of the destructive hydropolymerization of isobutylene seems to be confirmed; one part of the isobutylene molecules decomposes in the presence of hydrogen on the catalyst surface, and cyclohexene is methylated by the resulting radicals. Under equal conditions, but without cyclohexene, these radicals react with the initial isobutylene to form 2-methyl-substituted hydrocarbons. A method by Ya. T. Eydus and T. L. Fedichkina is mentioned (not described in the text, Ref. 8). There are 1 table and 8 Soviet references.

ASSOCIATION: Institut organicheskoy khimii im. N. D. Zelinskogo Akademii nauk SSSR (Institute of Organic Chemistry imeni N. D. Zelinskiy of the Academy of Sciences USSR)

PRESENTED: July 7, 1960, by B. A. Kazanskiy, Academician

SUBMITTED: June 30, 1960

Card 2/2

88362
S/195/60/001/004/012/015
B017/B055

5.1190

AUTHORS: Eydus, Ya. T., Nefedov, B. K.

TITLE: Comparative Studies on the Activity of Cobalt Catalysts in
Polymerization and Hydropolymerization Reactions of
Isobutylene

PERIODICAL: Kinetika i kataliz, 1960, Vol. 1, No. 4, pp. 604-611

TEXT: Polymerization and hydropolymerization of isobutylene in H_2 and
 $H_2 + CO$ over Co/ThO_2 /kieselguhr catalysts was investigated. Data on
polymerization of isobutylene over ThO_2 /kieselguhr are given in Table 1.
The data on isobutylene polymerization on Co /kieselguhr are shown in
Tables 2 and 3. Polymerization of isobutylene on kieselguhr proceeds by
an ionic mechanism. Addition of Co and ThO_2 lower the activity of
kieselguhr with respect to the ionic polymerization of isobutylene.
Experimental data on the hydropolymerization of isobutylene under the
influence of CO and using Co /kieselguhr and Co/ThO_2 as catalysts are
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given in Tables 5-8. The percentages of isobutylene and hydrogen entering into reaction on Co/kieselguhr as functions of the CO content of the initial gas mixture are represented in a figure. On Co/kieselguhr, the hydropolymerization of isobutylene occurs simultaneously with its ionic polymerization and the formation of carbon from CO and H₂ by radical mechanism. The various fractions obtained by hydropolymerization on the Co/ThO₂/kieselguhr catalyst are described in Table 9. There are 1 figure, 9 tables, and 12 references: 11 Soviet and 1 US.

ASSOCIATION: Institut organicheskoy khimii im. N.D. Zelinskogo AN SSSR
(Institute of Organic Chemistry imeni N. D. Zelinskiy AS
USSR)

SUBMITTED: June 14, 1960

Card 2/2

S/062/61/000/002/008/012
B115/B207

AUTHORS: Eydus, Ya. T. and Nefedov, B. K.
TITLE: Catalytic polymerization of olefins. Report no. 12.
Polymerization of isobutylene in the presence of Kisatibi
kieselguhr
PERIODICAL: Izvestiya Akademii nauk SSSR. Otdeleniye khimicheskikh
nauk, no. 2, 1961, 338-343

TEXT: The authors found that kieselguhr from the Kisatibi deposit is a highly active catalyst of isobutylene polymerization. They used the same apparatus and methods as in their previous studies (Ref. 5, Dokl. AN SSSR, 1959, v. 124, 111, and others), i.e., a continuous apparatus at atmospheric pressure. Kisatibi kieselguhr proved to be more active and stable than red clay. Its activity is close to that of the likewise highly active synthetic aluminum silicate (Tables 3 and 4) which, however, causes stronger cracking, and exerts a stronger isomerizing effect. The authors used kieselguhr in two forms: Catalyst 1 - rock reduced to small pieces and granulated to 3 mm grain size; catalyst 2 - granulated

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directly from the rock. In their effect, no difference was noticed. The authors describe the effect: 1) of the reaction temperature of 110-240°C at constant volume velocity $\sim 100 \text{ h}^{-1}$ upon the yield in polymers; 2) of the volume velocity 50-650 h^{-1} at constant temperature of 160°C upon the yield; 3) of the temperature of 125-240° at a volume velocity of 100 h^{-1} upon the composition of the polymerization products, and 4) of the volume velocity 50-700 h^{-1} at 160°C upon this composition. Ad 1): The liquid polymerizate yield (referred to initial isobutylene) is highly temperature-dependent. The curve (Fig. 1) passes at 150-160°C a distinct maximum (yield $\sim 75\%$). The yield in liquid products referred to reacted isobutylene remains 90-100% independent of temperature and volume velocity here and in case 2. Ad 2): The results are shown in Fig. 2. At a volume velocity of more than 500 h^{-1} , the yield in liquid products decreases whereas the capacity of the catalyst increases. Above 650 h^{-1} , both mentioned

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parameters decrease. Ad 3): Tables 1 and 2, as well as Fig. 3, show the results. Ad 4): Tables 3 and 4, as well as Fig. 4, list the results obtained. Summarizing, the authors find that the isobutylene polymerization on Kieselguhr sets in at 100-110°C, and gives the best yield at 150-160°C. The reaction products are composed of di- and trimers of isobutylene. The rise in reaction temperature, as well as the reduction of the volume velocity, favor skeleton isomerization and isomerization due to a shift of the double bond, and partly also cracking. The authors mention papers by L. G. Gurvich, S. V. Lebedev and collaborators, Ya. M. Slobodin, B. A. Kazanskiy, and M. I. Rozengart. There are 4 figures, 4 tables, and 9 Soviet-bloc references.

ASSOCIATION: Institut organicheskoy khimii im. N. D. Zelinskogo
Akademii nauk SSSR (Institute of Organic Chemistry imeni
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SUBMITTED: September 28, 1959

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Таблица 1

1 Свойства полимеризата	2, Температура реакции, °C					
	125	140	160	180	210	240
d_4^{20}	0,7207	0,7086	0,7042	0,7038	0,7079	0,7077
n_D^{20}	1,4218	1,4191	1,4188	1,4178	1,4158	1,4155
3. Начало кипения, °C	101	99,5	96	92	94,5	51

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Таблица 2

3. Пределы кипения фракций, °C	2. Температуры реакции, °C					
	125	140	160	180	210	240
4. Содержание фракций, об. %						
<101	0,0	0,7	4,5	8,9	4,9	10,0
101—102						
A. (2,4,4-триметил- пентен-1)	44,4	37,7	36,0	34,8	32,8	14,2
104—105						
B. (2,4,4-триметил- пентен-2)	11,4	11,6	13,3	7,9	12,0	9,1
105—130						
C. (изомерные октены)	2,8	2,0	8,2	12,4	24,4	44,2
177—188						
D. (тримеры)	25,5	27,8	23,3	18,5	14,7	7,8
>188	—	7,0	7,5	3,5	1,3	5,2

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Таблица 3

А. Свойства полимеризата	Б. Объемная скорость изобутилена, час ⁻¹				
	50	100	500	700	100
	В. кизельгур (кисатиби)				З. САС *
d_4^{20}	0,7172	0,7042	0,7177	0,7055	0,7209
n_D^{20}	1,4205	1,4188	1,4154	1,4148	1,4275
Ж. Начало кипения, °C	94	96	98,5	101	45

* САС — синтетический алюмосиликат.



Card 6/9

Catalytic polymerization of ...

S, 000, 01/000/002/000/012
B115/B207

Legend to Tables 1, 2, 3, 4: 1 - properties of the polymerizate;
2 - reaction temperature, °C; 3 - boiling limits of the fractions, °C
(transition fractions omitted); 4 - content of fractions, % by
volume; 5 - beginning of boiling, °C; 6 - volume velocity of
isobutylene, h⁻¹; 7 - Kieselguhr; 8 - synthetic aluminum
silicate. Tables 2 and 4: A - 2,4,4-trimethyl pentene-1,
B - 2,4,4-trimethyl pentene-2, C - isomeric octenes, D - trimers;

Таблица 4

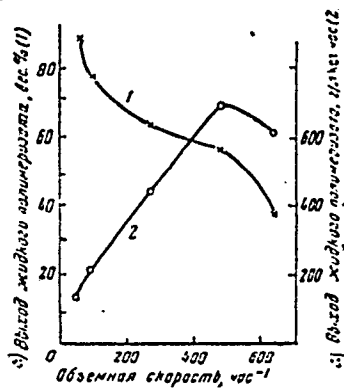
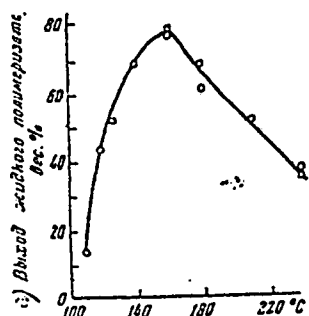
3. Пределы кипения фракций, °C	6. Объемная скорость изобутилена, час. ⁻¹				
	50	100	500	700	100
	4. Содержание фракций, об. %				
	7. кieselгуhr (кieselguhr)				САС
<101	17,0	4,5	4,7	0,0	9,8
101-102					
A. (2,4,4-триметилпентен-1)	20,4	33,4	47,0	52,5	12,4
104-105					
B. (2,4,4-триметилпентен-2)	10,0	10,6	4,5	7,5	5,6
105-117					
C. (изомерные октены)	12,4	8,2	5,3	7,3	19,0
177-188					
D. (тримеры)	24,0	23,3	18,6	18,4	20,6
>188	8,0	7,5	1,1	3,1	16,9

Card 7/9

Catalytic polymerization of ...

S/062/61/000/002/008/012
B115/B207

Legend to Figs. 1 and 2: Yield (a) in liquid polymerizate in % by weight of the isobutylene passed through: Fig. 1 in dependence on temperature, 2 - on the volume velocity, curve 1 - in % by weight, curve 2 - in g/l kat. h.

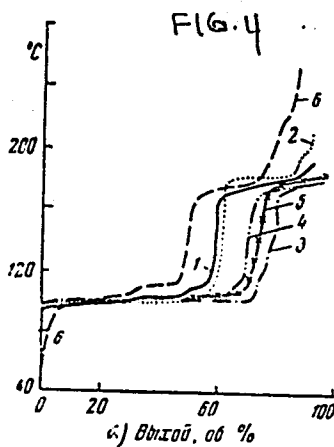
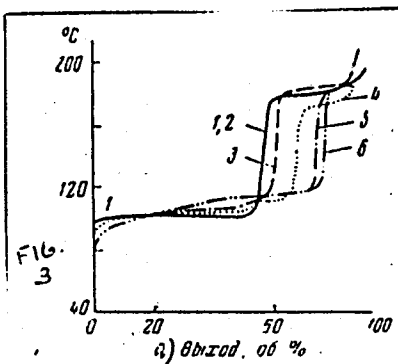


Card 8/9

Catalytic polymerization of ...

S/062/61/000/002/008/012
B115/B207

Legend to Figs. 3 and 4: Curves of the polymerizate distillation,
Fig. 3: at different temperatures, Fig. 4: at different volume
velocities (curve 6: with the use of synthetic aluminum silicate)



Card 9/9

S/062/61/000/005/006/009
B118/B220

AUTHORS: Eydus, Ya. T. and Nefedov, B. K.

TITLE: Catalytic polymerization of olefins. Communication 13.
Polymerization of isobutylene in the presence of some silica
gel specimens

PERIODICAL: Akademiya nauk SSSR. Izvestiya. Otdeleniye khimicheskikh
nauk, no. 5, 1961, 894 - 901

TEXT: The authors of the present paper have shown (Ref. 4: Dokl. AN SSSR, 124, 111 (1959); Ref. 5: Izv. AN SSSR, Otd. khim. n. 1961, 338) that isobutylene polymerizes in the presence of red clay and/or kieselguhr. In this reaction, kieselguhr shows approximately the same activity as the synthetic aluminum silicate catalyst used in the cracking process. The authors aimed at studying the catalytic activity of several silica gel specimens of different types in the polymerization of isobutylene at increased temperature. At a temperature of 190°C and under atmospheric pressure it has been found that the finely porous specimens ACM (ASM), KCM (KSM), and especially WCM (ShSM) are particularly active, only the coarse-grained silica gel KCK (KSK) showed reduced activity. The products involved are
Card 1/3

S/062/61/000/005/006/009
B118/B220

Catalytic polymerization of...

by Voskresenskiy khimkombinat (Voskresensk Chemical Combine). The products of polymerization obtained in the presence of the specimens KSK and ASM consist mainly of 2,4,4-trimethyl pentene-1 (up to 45 %); 2,4,4-trimethyl pentene-2 (10 %) and of trimers (15 to 25 %). When using the remaining specimens of silica gel, the polymerization of isobutylene is accompanied by a skeleton isomerization and the formation of odd polymers (hydrocarbons C₅ to C₇). The optimum reaction temperature (in the range 100 to 500°C) amounts to 190°C. Of the silica gels studied, only the specimen KSK can be regenerated, i. e., with air at 300°C. The silica gel specimens studied show a poor catalytic stability. It has been found, that the specific surface of the specimens is not of decisive importance; thus, the silica gel ShSM is much more active than KSK, although its specific surface is much smaller than that of the latter. There are 3 figures, 7 tables and 13 references; 11 Soviet-bloc and 2 non-Soviet-bloc. The 2 references to English-language publications read as follows: B. I. Mair, J. Res. Natl. Bur. Stand, 34, 435 (1945); D. F. Fink, R. W. Lewis, F. T. Weiss, Analyt. Chem. 22, 850 (1950); Ch. Thomas, Industr. and Engng. Chem. 41, 2564 (1949)

Card 2/3

Catalytic polymerization of...

S/062/61/000/005/006/009
B119/B220

ASSOCIATION: Institut organicheskoy khimii im. N. D. Zelinskogo Akademii
nauk SSSR (Institute of Organic Chemistry im. N. D. Zelinskiy
of the Academy of Sciences USSR)

RECEIVED: March 10, 1960

Card 5/5

S/030/61/000/002/001/011
B105/B206

AUTHOR: Eydus, Ya. T., Doctor of Chemical Sciences

TITLE: N. D. Zelinskiy and the development of organic catalysis

PERIODICAL: Vestnik Akademii nauk SSSR, no. 2, 1961, 22 - 29

TEXT: The role played by N. D. Zelinskiy as a co-founder of the theory and practice of catalytic conversion of hydrocarbons is described in this article. The author subdivides the catalytic reactions performed by Zelinskiy and his school in the 10 main parts: 1) dehydrogenation and hydrogenation catalysis. 1,1-dimethylcyclohexane partly is converted to toluene and m-xylene (B. A. Kazanskiy, A. L. Liberman, and S. I. Khromov). N. D. Zelinskiy jointly with N. I. Shuykin and S. S. Novikov studied the conversion of low-grade gasolin into high-octane aviation gasolin. Most favorable conditions and active, stable catalysts on the basis of metals of the 8th group were selected for this reaction (N. I. Shuykin and Kh. M. Minachev). Dehydrogenation of heterocyclic compounds on the same catalysts was also studied (N. D. Zelinskiy, P.P. Borisov and Yu.K. Yur'yev). ✓

Card 1/5

N. D. Zelinskiy and the ...

S/030/61/000/002/001/011
B105/B206

2) Irreversible catalysis. The behavior of cyclohexene, cyclohexane and decalin compounds with double and triple bonds in side chains is described (R.Ya. Levina). Cyclopentene undergoes a number of weak reactions in the presence of platinum as well as oxide catalysts (A. F. Plate). 3) Hydrogenolysis of the five-membered cyclanes. Reaction is inhibited by an increase of the hydrogen pressure (B. A. Kazanskiy and Ye. M. Terent'yeva). A catalyst which is inactive with regard to hydrogenolysis was developed (B. A. Kazanskiy and T. F. Bulanova). A modern combined method for the analysis of gasolin from direct distillation was obtained (B. A. Kazanskiy, G. S. Landsberg and collaborators). 4) Aromatization of paraffinic hydrocarbons (6-dehydrocyclization). In 1936, B.L. Moldavskiy, G.D. Kamusher and V.I. Karzhev, independently of other scientists, performed the reaction in the presence of oxide catalysts at a temperature of from 450 to 500°C. With aromatic ring a long aliphatic chain is dehydrocyclized under formation of a new 6-membered ring (B.L. Moldavskiy, S.R. Sergiyenko and S.S. Nametkin). 5) 5-dehydrocyclization. Dehydrocyclization of the paraffinic hydrocarbons in cyclopentane with the same number of

Card 2/5

S/030/61/000/002/001
B105/B206

N.D. Zelinskiy and the ...

carbon atoms proceeds on carbon at 310°C at a low rate of hydrocarbon over platinum. 6) Isomerization reactions. The reaction of reciprocal isomerization of the saturated cyclanes with expansion and/or restriction of the ring, as well as conversions of the stereoisomers proceed in the presence of aluminum chloride and bromide respectively (N.D. Zelinskiy and M.B. Turova-Polyak). Cyclohexene hydrocarbons are isomerized into cyclopentene at 450°C by means of oxide catalysts (N.D. Zelinskiy and Yu.A. Arbuzov). 7) Cracking with aluminum chloride. It was used for the first time by N.D. Zelinskiy. 8) Desulfurization processes. They were developed by N.D. Zelinskiy and I.N. Tits. 9) Reactions on the basis of carbon monoxide, hydrogen, and olefins. By means of partial methylation of benzene into toluene it was possible to show an intermediate formation of the methylene radical (N.D. Zelinskiy, Ya.T. Eydus). A new reaction of the catalytic hydrocondensation of the carbon monoxide with olefins was discovered (Ya.T. Eydus and K.V. Puzitskiy), as well as of the catalytic hydropolymerization of the olefins under the effect of small amounts of carbon monoxide in the presence of hydrogen (N.D. Zelinskiy, Ya.T. Eydus, N.I. Yershov, R.I. Izmaylov, M.B. Ordyan, B.K. Nefedov). 10) General theoretical problems of catalysis. N.D. Zelinskiy's theory on catalysis

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N.D. Zelinskiy and the ...

S/030/61/000/002/001/011
B105/B206

✓

was completed by his pupil A.A. Balandin in the multiplet theory. The central idea of this theory consists in the principles of structural and energetic conformity between reagents and catalysts. The catalytic and physical properties of nickel on aluminum oxide were investigated by A.M. Rubinshteyn. O.K. Bogdanova, A.P. Shcheglova, M.N. Marushkin, O.D. Sterligov, G.M. Marukyan, V.I. Isagulyants, D.V. Sokol'skiy and L.Kh. Freydlin are mentioned as collaborators of A.A. Balandin and B.A. Kazanskiy. A.A. Tolstopyatova, S.L. Kiperman, V.E. Vasserberg and G.V. Isagulyants work in the laboratories of A.A. Balandin, where various methods of modern physics and physical chemistry are applied. A.A. Balandin raised the problem of five layers of the intermediate state (diffusion layer, substituent layer, reacting atoms, active centers, the inner layer of the catalysts) and defined which theories of catalysis investigate the individual layers. The main interest should be focused on new types of catalysts (organic and biological). Studies of adsorption properties (electric and electronic, magnetic and X-ray structure) should be intensified for a thorough investigation of the selection theory. The effect of the course of the reaction on the catalyst properties as well as the effect of various types of

Card 4/5

N.D. Zelinskiy and the ...

S/030/61/000/002/001/011
B105/B206

radiation on it must also be clarified. The use of isotopes and of the method of electron paramagnetic resonance is also described as being necessary. Investigation methods for catalysts and catalytic reactions should be standardized. N.D. Zelinskiy's school and all Soviet scientists active in the field of organic catalysis face a topical problem, the discovery of and research into new catalytic reactions in the field of the conversion of hydrocarbons and other classes of organic compounds. Such investigations are described as being of great significance for the synthesis of monomers. Special attention should be devoted to the new catalytic reactions of condensation and polymerization. There are 4 Soviet-bloc references.

✓

Card 5/5

EYDUS, Ya.T.; NEFEDOV, B.K.; YAKOVLEV, I.P.; LOBZOVA, A.V.

Catalytic hydrocondensation of carbon monoxide with olefins and their hydropolymerization under the action of carbon monoxide and hydrogen. Report 31: Behavior of 2-methyl-1-butene and 3, 3-dimethyl-1-butene in hydrocondensation catalysis. Izv.AN SSSR.Otd.khim.nauk no.6:1127-1134 Je '61. (MIRA 14:6)

1. Institut organicheskoy khimii im. N.D.Zelinskogo AN SSSR.
(Butene) (Catalysis)

11.22/0 also 2209

25218

S/062/61/000/007/008/009
B117/B215

AUTHOR: Eydus, Ya. T.

TITLE: Catalytic reactions of hydropolymerization of olefins
and their hydrocondensation with carbon monoxide

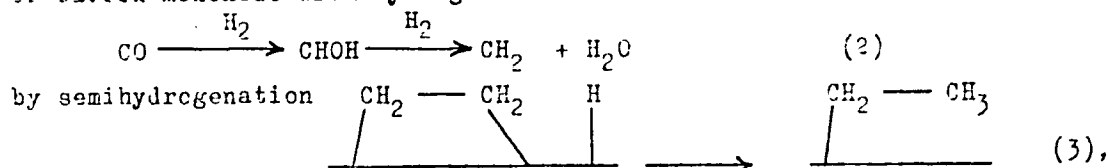
PERIODICAL: Akademiya nauk SSSR. Izvestiya. Otdeleniye khimicheskikh
nauk, no. 7, 1961, 1336-1342

TEXT: The present report was given at the general assembly of the Otdeleniye khimicheskikh nauk Akademii nauk SSSR (Department of Chemical Sciences of the Academy of Sciences USSR) held in Moscow on October 27, 1960. It is dedicated to hydrocondensation and hydropolymerization of olefins with carbon monoxide. The above reactions cause a synthesis of highest aliphatic hydrocarbons with largely normal structures. The reaction products mainly form at the expense of the olefin used, and contain considerable amounts of highest olefins. These amounts are the higher, the lower the molecular weight of the olefin used, and the lower the hydrogen content in the mixture. It was found that during the above reactions active intermediate forms are produced on the catalyst surface.

Card 1,6

Catalytic reactions of hydropolymerization... ²⁵²¹⁸ S/062/61/000/007/008/009
B117/B215

They are methylene- and alkyl radicals formed by the incomplete reduction of carbon monoxide with hydrogen



and finally by hydrogenolysis of hydrocarbon particles. These intermediate forms take effect on the direction of the reaction and on the composition of the final products. In the hydrocondensation of carbon monoxide with olefins, a mixture of CO and H₂ plays the part of an alkylating and, particularly, of a methylating reagent which causes the formation of homologs of the olefin. With cycloolefins the reaction is selective. A new property of CO becomes evident in hydropolymerization accompanying hydrocondensation. In small amounts, and in the presence of H₂, it initiates the hydropolymerization of α-olefins of the aliphatic series. At the same time, it participates in the formation of reaction

Card 2, 6

Catalytic reactions of hydropolymerization... ²⁵²¹⁸ S/062/61/000/007/008/009 B117/B215

products in which oxygen is separated in the form of water. Cycloolefins with double bonds in the cycle do not react. Table 1 gives the ratios of the methylation products obtained from equimolecular olefin - H₂ mixtures with 5% CO. A detailed study of the hydropolymerization of ethylene with hydrogen showed that this reaction is not initiated by CO itself, but by the active forms produced on the catalyst surface. The CO concentration in the gas mixture used has a considerable effect on the reaction course and the composition of reaction products (Ref. 10: Ya. T. Eydus, N. D. Zelinskiy i N. I. Yershov, Dokl. AN SSSR 60, 599 (1948); Izv. AN SSSR, Otd. khim.n. 1950, 377). Table 2 gives the effect of the CO concentration on the total yield and on the volume ratio between oil-, benzene-, and gasoil fractions (C₃—C₄) in the hydropolymerization product obtained from an equimolecular ethylene - hydrogen mixture. The hydropolymerization of olefins is characterized by the fact that the number of reacting olefin molecules per reacting CO molecule (called yield per initiator) is higher than 1, then rises up to several tens, and may again decrease as the concentration increases (Table 3). Since these numerical proportions are characteristic of chain reactions, it may be assumed that the hydropolymerization of olefins follows the

Card 3/6

25218

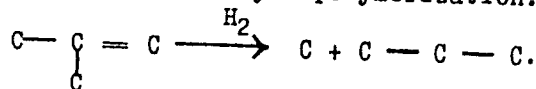
S/062/61/000/007/008/009

Catalytic reactions of hydropolymerization... B117/B215

mechanism of chain reactions. This is an exception in the field of heterogeneous catalysis. Besides active forms produced due to incomplete reduction of CO, semihydrogenated forms, namely, surface alkyl radicals, also play a considerable part in hydropolymerization. These radicals formed by semihydrogenation (reaction (3)) and by hydrogenolysis apparently act as initiators in the absence of CO. This effect is especially evident in the hydropolymerization of isobutylene. If CO is absent, isobutylene may undergo hydropolymerization in fundamentally different directions. This depends on the H_2 concentration in the binary mixture used (Ref. 23: Ya.T. Eyduş i B.K. Kefedov, Dokl. AN SSSR, 124, 111; 127, 1029 (1959); Izv. AN SSSR, Otd. khim. n. 1960, 125, 349; Ya. T. Eyduş, Kinetika i kataliz I, 117 (1960)). With $i = C_4H_8 : H_2 = 3$, actual polymerization according to Butlerov essentially occurs with formation of dimers and trimers. With $i = C_4H_8 : H_2 = 1$, stepwise formation of the homologs of isobutylene takes place. 2-methyl alkanes and the corresponding alkenes are formed. This reaction called "destructive hydropolymerization" of isobutylene is such: Isobutylene first undergoes hydrogenolysis into residues with one and three carbon atoms

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Catalytic reactions of hydropolymerization... ²⁵²¹⁸ S/062/61/000/007/008/009
B117/B215



The hydrogenolysis products then react with non-ruptured isobutylene molecules, and their homologs are formed. In conclusion, the examination of hydrocondensation and hydropolymerization of CO with olefins showed that olefins of normal structure enter this reaction much more readily than isoolefins with the same number of carbon atoms in the molecule, especially if the molecular weight of the former is low. α -olefins are much more reactive than β -olefins of the same molecular weight. The latter only react after their isomerization to the α -form (Refs. 18 and 19: Ya.T.Eydus i R.I. Izmaylov, Izv. AN SSSR, Otd. khim.n. 1956, 467, 475, 723, 869; Ya.T.Eydus i M.B. Ordyan, Izv. AN SSSR, Otd.khim.n. 1957, 1408; 1958, 243). There are 4 tables and 25 references: 23 Soviet-bloc and 2 non-Soviet-bloc. The two references to English-language publications read as follows: E.F.G. Herington, Trans. Faraday Soc. 37, 361 (1941); S.R. Craxford, E.K. Rideal, J.Chem.Soc. 1939, 1604, S.R.Craxford, J.Soc.Chem. ind. 66, 440 (1957).

Card 5/6

Catalytic reactions of hydropolymerization... ²⁵²¹⁸ S/062/61/000/007/008/009
B117/B215

ASSOCIATION: Institut organicheskoy khimii im. N.D. Zelinskogo Akademii
nauk SSSR. (Institute of Organic Chemistry imeni N. D.
Zelinskiy of the Academy of Sciences USSR)

PRESENTED: October 27, 1960

SUBMITTED: November 30, 1960

Card 6/6

28273
S/062/61/000/010/010/018
B106/B101

15.8063

AUTHORS: Yershov, N. I., Eydus, Ya. T., and Yerokhina, V. R.

TITLE: Catalytic hydrocondensation of carbon monoxide with olefins and their hydropolymerization under the action of carbon monoxide and hydrogen. Communication 33. Formation of higher hydrocarbons with a number of carbon atoms not being an integral multiple of the initial olefin

PERIODICAL: Akademiya nauk SSSR. Izvestiya. Otdeleniye khimicheskikh nauk, no. 10, 1961, 1871-1874

TEXT: The catalytic hydropolymerization of olefins under the action of carbon monoxide in the presence of hydrogen and the hydrocondensation of carbon monoxide with olefins yield both real polymers and their hydrogenation products, and a considerable quantity of higher hydrocarbons with a number of carbon atoms not being an integral multiple of the initial olefin. The authors clarified the reasons of formation of these higher hydrocarbons. The yield of these hydrocarbons increases with increasing

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25273

S/062/61/000/010/010/018

B106/B101

Catalytic hydrocondensation of carbon...

molecular weight of the initial olefin (double bond in 1-position) while the value of the mean multiple K_m decreases for the whole higher-boiling fraction of the condensate. $K_m = (\sum \alpha_i n_i) / n$ (2) (α_i = fraction of the i -th hydrocarbon in the higher-boiling fraction of the condensate; n_i = number of carbon atoms in the i -th hydrocarbon; n = number of carbon atoms in the initial olefin). The formation of larger amounts of higher hydrocarbons, the carbon number of which is not an integral multiple of the initial olefin, can be explained neither by hydrocracking of the initial olefin nor by its hydrocondensation with carbon monoxide. Therefore, it is assumed that the formation of the higher hydrocarbons mentioned is due to the cleavage of carbon-carbon bonds during hydropolymerization or hydrocondensation. Radicals are formed which may lead to the formation of higher hydrocarbons with a carbon number not being an integral multiple of the initial olefin. The authors conclude: In catalytic reactions of olefins under the action of carbon monoxide and hydrogen, the hydrocarbon chains grow less by molecular interaction of the initial olefin than by reaction

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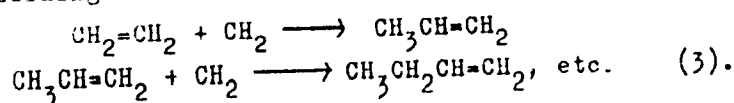
28273

S/062/61/000/010/010/018

B106/B101

Catalytic hydrocondensation of carbon...

of the initial olefin with radicals formed by cleavage of carbon-carbon bonds on the catalyst. Therefore, the higher-boiling reaction products mainly yield hydrocarbons the carbon number of which is not an integral multiple of the initial olefin. Hydrocarbons with fewer carbon atoms than are present in the initial olefin are also formed in small quantity. The cleavage of the C-C bonds is facilitated by plane addition of the absorbed olefin molecule to the catalyst surface and the resulting deformation. This plane absorption only occurs at low carbon monoxide concentrations. At higher concentrations, the carbon monoxide may displace, from the catalyst surface, the carbon atoms of the olefin which do not lie at the double bond. This eliminates the deformation of the olefin molecule. Under such conditions, the hydrocarbon chain may grow without cleavage of carbon-carbon bonds by hydrocondensation of the olefin with the carbon monoxide according to the following scheme:



Thus, the type of adsorption of the olefin molecule and, therefore, also

Card 3/4

X

Catalytic hydrocondensation of carbon...

28273
S/062/61/000/010/010/018
B106/B101

the direction of the reaction may change as dependent on the content of carbon monoxide and hydrogen in the initial gas mixture and on the capability of the olefin of being adsorbed. These reciprocal transitions of the reactions of olefins under the action of carbon monoxide and hydrogen will be thoroughly studied in the following communication. There are 8 references: 7 Soviet and 1 non-Soviet. The reference to the English-language publication reads as follows: A. W. Fletcher, E. J. Gibson, Radioisotope Conf. II, 41 (1954).

ASSOCIATION: Institut organicheskoy khimii im. N. D. Zelinskogo Akademii nauk SSSR (Institute of Organic Chemistry imeni N. D. Zelinskiy of the Academy of Sciences USSR)

SUBMITTED: April 8, 1961

Card 4/4

15-8063

28274
S/062/61/000/010/011/018
B106/B101

AUTHORS: Eydus, Ya. T., Yershov, N. I., and Yerokhina, V. R.

TITLE: Catalytic hydrocondensation of carbon monoxide with olefins and their hydropolymerization under the action of carbon monoxide and hydrogen. Communication 34. Reciprocal transitions of formation reactions of hydrocarbons from mixtures of ethylene, hydrogen, and carbon monoxide

PERIODICAL: Akademiya nauk SSSR. Izvestiya. Otdeleniye khimicheskikh nauk, no. 10, 1961, 1874 - 1879

TEXT: It had been assumed previously (Ref. 1: N. I. Yershov, Ya. T. Eydus, Dokl. AN SSSR, 115, 1126 (1957); 119, 1062 (1958)) that one stage of the synthesis of higher hydrocarbons from carbon monoxide and hydrogen is a radically proceeding hydrocondensation of carbon monoxide with olefins. In the subsequent stages of synthesis, this reaction may change into a hydropolymerization of olefins, which constitutes a radical chain reaction. In the present study, the authors considered the possibility of a similar transition of these reactions into each other on

Card 1/5

X

Catalytic hydrocondensation of...

28274
S/062/61/000/010/011/018
B106/B101

a catalyst that is efficient both in the reaction according to Orlov-Fischer-Tropsch, and in hydropolymerization reactions of olefins and their hydrocondensation with carbon monoxide. Such a catalyst was obtained by activating a Co-clay catalyst with addition of 18% ThO_2 (referred to metallic cobalt). A Co-kieselguhr catalyst is also catalytically active in all reactions mentioned. The tests were conducted at 190°C and atmospheric pressure in a flowing system. The volume velocity of the initial gas mixture was close to 100 hr^{-1} . Before the tests, the catalyst was reduced with hydrogen at 450°C for 5 hr; the catalyst was regenerated in the same manner. Binary mixtures $\text{CO} - \text{H}_2$ (1:2) and ternary mixtures $\text{C}_2\text{H}_4 - \text{H}_2 - \text{CO}$ of different compositions were used as initial mixtures. No liquid hydrocarbons but mainly CH_4 , CO_2 , and H_2O were formed in the tests with binary mixtures $\text{CO} - \text{H}_2$ during the first 5-7 hr of the reaction, immediately after reduction of the catalyst. The same occurred immediately after regeneration of the catalyst. The formation of liquid hydrocarbons only begins after 6-7 hr contact time, their yield grows from

Card 2/5

28274

S/062/61/000/010/011/018

B106/B101

Catalytic hydrocondensation of...

one regeneration to the other (Fig. 1). Initial mixtures with 7-7.5% CO and with 25-35% CO were used in tests with $C_2H_4 - H_2 - CO$ mixtures. At lower CO concentrations under otherwise equal conditions, the yield of liquid hydrocarbons was 2-3 times the yield at high CO concentrations. In the presence of small CO amounts the ethylene hydropolymerizes, at higher CO concentrations hydrocondensation with carbon monoxide occurs. Thus, it is possible to attain a transition from one reaction into another, and vice versa, by changing the composition of the initial gas in the presence of the catalyst. A reduction of the C_2H_4/H_2 ratio in the initial mixture favors hydrogenation of ethylene to ethane. It was found that the molar ratios at which CO, H_2 , and C_2H_4 react with formation of liquid hydrocarbons are very similar to the molar ratios of these gases in the initial mixture. Fig. 1 shows that hydropolymerization and hydrocondensation in ternary mixtures also proceed in the first 5-7 hr after reduction or regeneration of the catalyst, and even produce maximum yields of liquid hydrocarbons in the period of regeneration. The synthesis of hydrocarbons from CO and H_2 , however, yields only methane

Card 3/5

23274

S/062/61/000/010/011/018
B106/B101

X

Catalytic hydrocondensation of...

at the same stage. This interesting fact may be explained as follows:
In the synthesis of hydrocarbons from CO and H₂, the reduction of carbon monoxide produces radicals which either polymerize (methylene radicals) or condense, e.g., with cleavage of water (hydroxy methylene radicals). During methane formation at the beginning of contact, the interactions of radicals are apparently hindered so that the radicals act on the adjacent particles (hydrogen in binary CO - H₂ mixtures, olefin in ternary olefin - CO - H₂ mixtures). Thus, the same factors that effect methane formation in the synthesis from CO and H₂ favor, in the case of ternary mixtures, the hydropolymerization of olefins under the action of small CO amounts and the hydrocondensation of CO with olefins. In this case, the methylene radicals do not associate but are preserved as reaction centers and reaction initiators with the help of olefins. There are 1 figure, 3 tables, and 10 references: 7 Soviet and 3 non-Soviet. The two references to English-language publications read as follows:
E. F. G. Herington, L. A. Woodward, Trans. Faraday Soc. 35, 958 (1939);
S. R. Craxford, Trans. Faraday Soc. 35, 947 (1939).

Card 4/5

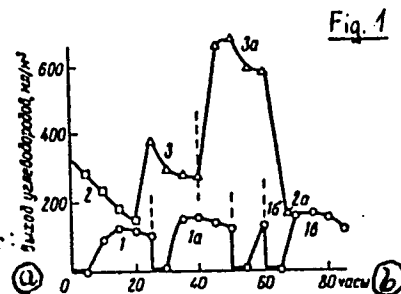
Catalytic hydrocondensation of...

262/4 S/062/61/000/010/011/018
B106/B101

ASSOCIATION: Institut organicheskoy khimii im. N. D. Zelinskogo Akademii nauk SSSR (Institute of Organic Chemistry imeni N. D. Zelinskiy of the Academy of Sciences USSR)

SUBMITTED: April 8, 1961

Fig.1. Various types of formation reactions of hydrocarbons and their reciprocal transformation. Legend: (a) hydrocarbon yield, ml/m²; (b) hours; (1), (1a), (1b), and (1c) synthesis of hydrocarbons from CO and H₂; (2) and (2a) hydrocondensation of CO with C₂H₄ (initial mixture contained 25% CO); (3) and (3a) hydropolymerization of C₂H₄ under the action of CO (initial mixture contained 7-7.5% CO); the vertical broken lines indicate the instant of catalyst regeneration.



Card 5/5

Z/011/62/019/001/010/017
E073/E136

AUTHORS: Eydus, Ya.T., and Nefedov, B.K.

TITLE: Conversion of isobutylene and other iso-olefins under conditions of hydrocondensation of CO with olefins

PERIODICAL: Chemie a chemická technologie. Přehled technické a hospodářské literatury, v.19, no.1, 1962, 33, abstract Ch 62-451. (Neftekhimiya, v.1, no.1, 1961, 74-81)

TEXT: Isobutylene polymerizes on cobalt catalysts on silica gel at 190 °C and atmospheric pressure to di- and tri-isobutylenes. The presence of small quantities of hydrogen increases the yield of the polymerization, whilst equivalent quantities of hydrogen bring about destructive hydro-polymerization accompanied by the formation of 2-methyl substitution alkanes and alkenes. The higher olefins have a low reaction capacity under these conditions.
1 table, 11 references.
[Abstractor's note: Complete translation.]

Card 1/1

S/204/61/001/006/002/004
E075/E436

AUTHORS: Eydus, Ya.T., Nefedov, B.K.

TITLE: Catalytic polymerization of olefins
14th Communication. Polymerization of ethylene
over nickel protoxide-aluminosilicate catalyst under
elevated pressure

PERIODICAL: Neftekhimiya, v.1, no.6, 1961, 786-790

TEXT: The object of the work was to investigate the influence of elevated pressure on the polymerization of ethylene in the presence of nickel protoxide-aluminosilicate catalyst. The catalyst was prepared by treating synthetic aluminosilicate with a solution of nickel in nitric acid. It was activated in air for 5 hours at 450°C and atmospheric pressure. It was shown that the catalyst is active both under atmospheric and higher pressures (5 to 30 atm). However, depending on the pressures, different reaction products formed at the optimum reaction temperature of 275°C. Thus ethylene polymer formed under atmospheric pressure and liquid products under increased pressure (to 30 atm). An increase in pressure and a decrease in space velocity or ethylene feed rate
Card 1/2

Catalytic polymerization ...

S/204/61/001/006/002/004
E075/E436

favoured the formation of liquid hydrocarbons. The yield of polymer decreased with the increasing pressure and was relatively little dependent on the space velocities in the range of 500 to 1000 h⁻¹ and the reaction temperature between 200 to 275°C. For the space velocities of the order of 100 h⁻¹ and elevated pressure a process of hydrogen redistribution took place. This was suggested by the presence of saturated hydrocarbons in the gaseous and liquid portions of the polymerization products. There are 2 figures and 3 tables.

ASSOCIATION: Institut organicheskoy khimii AN SSSR
im. N.D.Zelinskogo
(Institute of Organic Chemistry AS USSR
imeni N.D.Zelinskiy)

SUBMITTED: October 21, 1961

Card 2/2

BYDUS, I. T.^{Ya} [Bydus, Ya. I.]; NEFEDOV, B. K.

Polymerisation of isobutylene. Analele chimie 16 no.1:3-38 Ja-Mr '61.
(EEAI 10:9)

(Polymers and polymerisation) (Methylpropene)

EYDUS, Ya. T.; PUZITSKIY, K.V.; GUSEVA, I.V.

Synthesis of esters and other derivatives of carboxylic acids under conditions of oxidative catalysis from carbon monoxide, olefins, and compounds subject to acylations. Part 5: Synthesis of esters of cis-9-decalincarboxylic acid from cyclopentene and of 4,7-endomethylenehydrindancarboxylic acid from 4,5,6,7,8,9-hexahydro-4,7-endomethylenindene. Zhur. ob. khim. 31 no.4:1324-1328. Ap '61. (MIRA 14:4)

1. Institut organicheskoy khimii Akademii nauk SSSR.
(Naphthalenecarboxylic acid)
(Indancarboxylic acid)

PUZITSKIY, K.V.; EYDUS, Ya.T.; RYABOVA, K.G.

Synthesis of esters and other derivatives of carboxylic acids under conditions of acid catalysis from carbon monoxide, olefins, and acylating compounds. Part 6: Synthesis of esters from -olefins C₈-C₁₀ of normal structure. Zhur.ob.khim. 31 no.5:1689-1692 My '61. (MIRA 14:5)

1. Institut organicheskoy khimii AN SSSR imeni N.D.Zelinskogo.
(Acids, Organic) (Olefins)

25393

S/090/61/034/002/013/025
A057/A129

5.3400

AUTHORS: Puzitskiy, K.V., Sterligov, O.D., Belen'kaya, A.P., Eydus,
Ya.T.

TITLE: Preparation of carboxylic acid esters from amylene mixtures

PERIODICAL: Zhurnal Prikladnoy Khimii, v 34, no 2, 1961, 366-369

TEXT: Carboxylic acid methyl esters were obtained with a 55-63% yield by carbomethoxylation of amylene mixtures with different structure. The main product is methyl ester of α,α -dimethylbutyric acid, i.e., a carboxylic acid ester with a quaternary carbon atom in α -position. Amylenes are important for the manufacture of high-octane compounds in gasoline or for detergents. In a previous paper (Ref 3: ZhOKh, 30, 3799 (1960)) the present authors investigated syntheses of carboxylic acid esters from single amylenes with various structures using H_2SO_4 , CO and CH_3OH and observed that the main reaction product is always the methyl ester of α,α -di-

X

Card 1/5

25392

S/080/61/034/002/013/025

A057/A129

✓

Preparation of carboxylic acid esters ...

methylbutyric acid. Thus the latter was also to be expected as main reaction product from a mixture of amylenes. In the present experiments catalyzates of the dehydrogenation of iso-pentane and n-pentane, as well as the pentane-amylene fraction of thermal cracking products of gas oil (Tab.1) were carboxymethylated. Reactions and identification of the obtained esters were carried out in procedures described already in the previous paper (Ref 3). Conditions and the obtained results were presented in Table 2,3. There is 1 figure, 3 tables and 14 references: 6 Soviet-bloc and 8 non-Soviet-bloc. Three of the English-language references read as follows: F.C. Whitmore, F.A. Karnatz, J. Am. Chem. Soc., 60, 2533 (1938); D.V.N. Hardy, J. Chem. Soc., 464 (1938), J.M. Holbert, J. Am. Pharm. Assoc. Sci. Ed., 35, 315 (1946).

SUBMITTED: March 14, 1960

Card 2/5

EYDUS, Ya.T., doktor khim.nauk

Outstanding investigator in the chemistry of the hydrocarbons.

Priroda 50 no. 3:34-37 Mr '61.

(MIRA 14:2)

(Hydrocarbons)

(Zelinskii, Nikolai Dmitrievich, 1861-1953)

PUZITSKIY, K.V.; EYDUS, Ya.T.; RYABOVA, K.G.

Synthesis of carboxylic acids and their esters under conditions
of acid catalysis from carbon monoxide and alcohols. Dokl. AN
SSSR 141 no.3:636-637 N '61. (MIRA 14:11)

1. Institut organicheskoy khimii im. N.D. Zelinskogo AN SSSR.
Predstavleno akademikom B.A. Kazanskim.

(Acids, Organic)

(Carbon monoxide)

(Alcohols)

S/062/62/000/005/008/008
B110/B101

AUTHORS: Yershov, N. I., Eydus, Ya. T., and Yerokhina, V. R.

TITLE: Catalytic hydrocondensation of carbon monoxide with olefins and their hydropolymerization under the action of carbon monoxide and hydrogen. 36. Hydrocondensation and hydropolymerization of olefins on the nickel catalyst

PERIODICAL: Akademiya nauk SSSR. Izvestiya. Otdeleniye khimicheskikh nauk, no. 5, 1962, 911-916

TEXT: The specific character of the nickel catalyst (as compared with the Co catalyst) was examined, and the hydropolymerization of ethylene, propylene, and butylene under CO action was tentatively performed on it. The catalyst was Ni-Mn-Al₂O₃ kieselguhr (100:20:10:100). However, the synthesis of liquid hydrocarbons from $1\text{CO}+2\text{H}_2$ (200°C) does not set in until after 20 hrs. The yield first attained 128 ml/m³, then 145 ml/m³, while that of CO₂ and CH₄ dropped to ~10 and 20-25%. With 15-18% addition of ethylene to $1\text{CO}+2\text{H}_2$, liquid hydrocarbons formed in the
Card 1/4

Catalytic hydrocondensation of carbon ... S/062/62/000/005/008/008
B110/B101

first hours already under ~75% hydrogenation of ethylene. This is brought about (1) by dilution of the initial CO-H₂ mixture with ethylene which, in reducing the reaction rate, also reduces the catalyst heating, and thus inhibits the methane formation; (2) by preferred ethylene adsorption to the most active catalyst centers, at which the methane formation takes place.. Since the hydrocarbon formation from carbon monoxide and hydrogen in the presence of ethylene takes place at the less active catalyst centers, liquid hydrocarbons are immediately formed. Ethylene is most readily hydrogenated on the catalyst: at 100°C, the process was almost as rapid as at 200°C, the yields of gaseous paraffin hydrocarbons being 25-27% at 100°C and 29.4% at 200°C. At 190-200°C on the Ni catalyst, ethylene chiefly reacts with hydrogen, as the latter cannot react with the products of incomplete CO reduction. If, however, this is made possible, ethylene can take part in the synthesis of higher hydrocarbons. Thus, when a binary mixture of 1CO+2H₂ and ethylene was alternately blown through for 3 and 6 min, respectively, the yield of liquid hydrocarbons was 240-260 ml/m³. 60-68% of reacting ethylene is

Card 2/4

Catalytic hydrocondensation of carbon ... S/062/62/000/005/008/008
B110/B101

hydrogenated to ethane. When alternately blowing through with propylene (6 min) and $1\text{CO}+2\text{H}_2$ (3 min), the hydrocarbon yield was raised to $154-172 \text{ ml/m}^3$, i. e., it rose by $60-79 \text{ ml/m}^3$ as compared with the binary mixture. The propylene hydrogenation was relatively poor in this connection (17.5% of initial propylene). When alternately blowing through with butylene (6 min) and $1\text{CO}+2\text{H}_2$ (3 min), the olefin yield rose to 210 ml/m^3 , and the yield of gaseous paraffins dropped to 9-10% of initial butylene. When blowing through with ternary mixtures of Co, H_2 , and olefin (ethylene, propylene, butylene) at 190°C and an atmospheric pressure with $\sim 100 \text{ hr}^{-1}$ volume rate on the Ni catalyst, the olefin is hydrogenated to the corresponding paraffin. The formation of higher hydrocarbons from CO and H_2 in the presence of ethylene and its homologs takes place at $190-200^\circ\text{C}$ on the catalyst surface which is free from olefin molecules. This surface is the smaller the higher the olefin concentration in the initial gaseous mixture. This causes the yield of liquid hydrocarbons to decrease on olefin addition. If, however, the olefin reacts with reduction products (methylene and other radicals),

Card 3/4

Catalytic hydrocondensation of carbon ... S/062/62/000/005/008/008
B110/B101

hydropolymerization and hydrocondensation prevail over olefin hydrogenation.
There are 4 tables.

ASSOCIATION: Institut organicheskoy khimii im. N. D. Zelinskogo
Akademii nauk SSSR (Institute of Organic Chemistry imeni
N. D. Zelinskiy of the Academy of Sciences USSR)

SUBMITTED: December 16, 1961..

Card 4/4

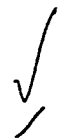
S/204/62/002/001/002/007
1032/1232

AUTHORS: ~~Eidus, Ya. T.~~, Nefedov, B. K. and Lobzov, A. V.

TITLE: Catalytic polymerisation of olefins. 15. On the liquid products of ethylene polymerization over nickel oxide — aluminium silicate catalyst under elevated pressure

PERIODICAL: Neftekhimiya, v. 2, no. 1, 1962, 21-27

TEXT: This is a study of the composition of the products of ethylene polymerization over a nickel oxide — aluminum silicate catalyst at 275°C, under pressures ranging between 5 and 30 atm. and at volume velocities between ~ 100 and 2000 hour⁻¹. The products of polymerization were rendered free of dissolved gases and fractionated by distillation in a column of 60 theoretical plates. Distillation curves and tables of physical constants of different fractions are given. Combinational dispersion (Raman) spectra of several fractions were taken. Identification of individual hydrocarbons in these fractions was done by means of comparison of the spectra taken with data found in the literature. It was found that the products of polymerisation contained mainly polymers with an even number of C atoms in the molecule, trimers and tetramers. Monomethyl-substituted alkenes, mainly 3-methyl-alkenes-2, predominated. Small amounts of 2-methyl-alkenes, *n*-alkenes disubstituted alkenes and the corresponding alkanes as well as hydrocarbons with an odd number of C atoms in the molecule were also found. The founation of these hydrocarbons indicates the occurrence of side re-



Card 1/2

Catalytic polymerization of olefins...

S/204/62/002/001/002/007

1032/1232

actions, such as isomeration, hydrogen redistribution, alkylation and de-alkylation. Elevation of pressure and decrease of volume velocity (within the limits of the interval studied), i.e. the increase of the time of contact, favour the formation of saturated hydrocarbons and of higher polymers and "odd-number" polymers. There are 3 figures and 1 table. An English-language reference reads as follows: J. P. Hogan, R. L. Banks, W. C. Lanning, A. Clark, Ind. Engng. Chem., 47, 752, 1955.



ASSOCIATION: Institut organicheskoi khimii AN SSSR im N. D. Zelinskogo (Institute of Organic Chemistry, AS USSR, im. N. D. Zelinskiy)

SUBMITTED: January 17, 1962

Card 2/2

EYDUS, Ya.T.; PUZITSKIY, K.V.; GUSEVA, I.V.

Synthesis of esters and other derivatives of carboxylic acids under conditions of acid catalysis from carbon monoxide, olefins, and acylating compounds. Part 7: Conversion of C_4 - C_7 alcohols to carboxylic acids and their esters with the aid of formic acid. Zhur.ob.khim. 32 no.9:2983-2989 S '62. (MIRA 15:9)

1. Institut organicheskoy khimii imeni N.D. Zelinskogo AN SSSR.
(Alcohols) (Acids, Organic) (Formic acid)

EYDUS, Ya.T.; PUZITSKIY, K.V.; RYABOVA, K.G.

Synthesis of esters and other derivatives of carboxylic acids under conditions of acid catalysis from carbon monoxide, olefins, and acylating compounds. Part 8: Synthesis of carboxylic acids and their esters from C₃ - C₅ alcohols and carbon monoxide. Zhur.ob.khim. 32 no.10:3198-3201 0 '62. (MIRA 15:11)

1. Institut organicheskoy organicheskoy khimii imeni N.D. Zelinskogo AN SSSR.
(Acids, Organic)
(Alcohols) (Carbon monoxide)

PUZITSKIY, K.V.; EYDUS, Y.A.T.; RYABOVA, K.G.; GUSEVA, I.V.

Synthesis of esters and other derivatives of carboxylic acids under conditions of acid catalysis from carbon monoxide, olefins, and acylating compounds. Part 9: Synthesis of carboxylic acids and their esters from (C₆-C₁₀) saturated alcohols. Zhur.ob.khim. 33 no.4: 1269-1273 Ap '63. (MIRA 16:4)

(Acids, Organic)

(Esters)

(Alcohols)

PUZITSKIY, K.V.; RABINOVICH, A.Yu.; EYDUS, Ya.T.

Synthesis and surface-active and cleansing properties of sodium salts of α,α -dimethylalkanoic acid. Zhur.prikl.khim. 35 no.12: 2740-2745 D '62. (MIRA 16:5)

1. Institut organicheskoy khimii imeni N.D.Zelinskogo AN SSSR i Moskovskiy filial Vsesoyuznogo nauchno-issledovatel'skogo instituta zhirov.

(Acids, Fatty) (Sodium salts) (Cleaning compounds)

S/020/62/147/005/021/032
B106/B186

AUTHORS: Eydus, Ya. T., Bulanova, T. F., Sergeyeva, N. S.

TITLE: Zirconium and titanium dioxides - promoters of the cobalt catalyst in the synthesis of higher hydrocarbons from carbon monoxide and hydrogen

PERIODICAL: Akademiya nauk SSSR. Doklady, v. 147, no. 5, 1962, 1105 - 1107

TEXT: The activating effect of ZrO_2 and TiO_2 on a cobalt-kieselguhr (1:1) catalyst was studied for the synthesis of higher hydrocarbons from CO and H_2 . All experiments were made in a continuous flow system at atmospheric pressure and various temperatures (20 - 30 hrs reaction time at each temperature). The initial gas mixture contained CO and H_2 at a ratio of 1:2. Fig. 1 shows the results obtained. It has been found that catalysts containing 18% TiO_2 or ZrO_2 are more active than the known catalyst with 18% ThO_2 . At optimum reaction temperatures (195°C - 210°C) of the catalyst activated with 18% TiO_2 , not merely low hydrocarbons of the type C_2-C_4 are

Card 1/2

Zirconium and titanium...

S/020/62/147/005/021/032
B106/B186

formed but higher hydrocarbons (from C_5 upward) at the volume ratio 0.6:1 (gasoline : oil) as compared with 18 : 1 at the optimum reaction temperature ($210^\circ C$) of the non-activated catalyst, and 0.9:1 gasoline - oil ratios obtained with the catalyst activated by 18% ThO_2 . There are 1 figure and

1 table. The English-language reference is: S. Kodama, Sci. pap. Inst. Phys. Chem. Res., 14, 253 (1930).

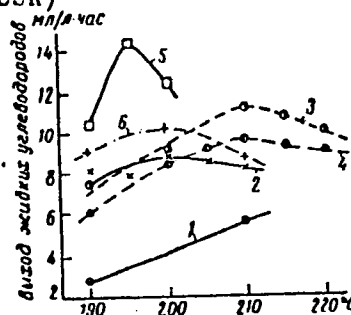
ASSOCIATION: Institut organicheskoy khimii im. N. D. Zelinskogo Akademii nauk SSSR (Institute of Organic Chemistry imeni N. D. Zelinskiy of the Academy of Sciences USSR)

PRESENTED: August 3, 1962, by B. A. Kazanskiy, Academician

SUBMITTED: July 12, 1962

Fig. 1. Activation of Co-kieselguhr (1:1) catalyst.
Legend: Ordinate: liquid hydrocarbon yield, ml/l·hr; (1) catalyst without promoter; (2) 12% ZrO_2 ; (3) 18% ZrO_2 ; (4) 24% ZrO_2 ; (5) 18% TiO_2 ; (6) 18% ThO_2 (for comparison).

Card 2/2



S/062/63/000/003/012/018
B101/B186

AUTHORS: Eydus, Ya. T., Nefedov, B. K., and Vol'pin, M. Ye.

TITLE: Formation of the cycloheptatriene from benzene, carbon oxide and hydrogen with a cobalt catalyst

PERIODICAL: Akademiya nauk SSSR. Izvestiya. Otdeleniye khimicheskikh nauk, no. 3, 1963, 548 - 552

TEXT: Working from the study by W. E. Doering, L. H. Knox et al. (J. Amer. Chem. Soc., 72,2305(1950)) and P. S. Skell, R. C. Woodworth, ibid., 78, 4496(1956)) the reaction of benzene with a CO+H₂ mixture at 190°C, 1-20 atm in the presence of a Co-ThO₂-kieselguhr catalyst was investigated.

It was found that small quantities of cycloheptatriene (about 0.01 % per reacted benzene) are formed. The low stability of the cycloheptatriene was proved by the fact that 98 % of it decompose if it is made to react with CO+H₂ under the conditions mentioned. This confirms that incomplete reduction of the CO methylene causes the formation of radicals which either are added to the C-H bond of the benzene, with toluene forming, or are

Card 1/2

Formation of the ...

S/062/63/000/003/012/018
B101/B186

included in the aromatic ring on a C=C bond with cycloheptatriene forming.

ASSOCIATION: Institut organicheskoy khimii im. N. D. Zelinskogo Akademii nauk SSSR (Institute of Organic Chemistry imeni N. D. Zelinskiy of the Academy of Sciences USSR); Institut elementoorganicheskikh soyedineniy Akademii nauk SSSR (Institute of Elemental Organic Compounds of the Academy of Sciences USSR)

SUBMITTED: May 30, 1962

Card 2/2

EYDUS, Ya.T.; YERSHOV, N.I.; YEROKHINA, V.R.; ANDREYEV, N.S.

Oxygen-initiated heterogeneous catalytic reaction of condensation of olefins in the presence of hydrogen. Part 2: Conversions of ethylene. *Kin. i kat.* 4 no.3:416-421 My-Je '63.

(MIRA 16:7)

1. Institut organicheskoy khimii imeni Zelinskogo AN SSSR.
(Ethylene) (Polymerization)
(Oxygen)

YERSHOV, N.I.; EYDUS, Ya.T.; YEROKHINA, V.R.; ANDREYEV, N.S.

Oxygen-initiated heterogeneous catalytic reaction of condensation of olefins in the presence of hydrogen. Part 3: Conversions of propylene. Kin. i kat. 4 no.6:829-834 N-D '63.
(MIRA 17:1)

1. Institut organicheskoy khimii imeni Zelinskogo AN SSSR.

EYEMOVA, Jirina, inz.

First experience of a programming specialist. Pod org 17 no.4:18~~2~~-
183 Ap '63.

1. Technicko-organizačni výzkumný ústav strojírenský.

EYDUS, Ya.T.; NEFEDOV, B.K.

Conversions of olefins in the presence of metal oxides. Usp.khim.
32 no.9:1025-1051 S '63. (MIRA 16:9)

1. Institut organicheskoy khimii imeni Zelinskogo AN SSSR.
(Olefins) (Metallic oxides)

PUZITSKIY, K.V.; EYDUS, Ya.T.; RYABOVA, K.G.

Synthesis of carboxylic acid esters from unsaturated hydrocarbons,
donors of hydride ions. Zhur..ob khim. 33 no.10:3278-3282 0 '63.
(MIRA 16:11)

1. Institut organicheskoy khimii imeni N.D.Zelinskogo AN SSSR.

EYDUS, Ya.T.; KAAL, T.A.

Synthesis of derivatives of carboxylic acids from carbon monoxide, olefins, and acylable compounds. Part 11: Effect of the pressure of carbon monoxide on the course of the reaction of carbomethoxylation of isobutylene and isobutyl alcohol. Zhur.ob.khim. 33 no.10:3283-3290 O '63.(MIRA 16:11)

1. Institut organicheskoy khimii imeni N.D.Zelinskogo AN SSSR.

BULANOVA, T.F.; EYDUS, Ya.T.; SERGEYEVA, N.S.; KHUDYAKOV, Yu.T.

Directed catalytic synthesis of solid paraffins from carbon
monoxide and hydrogen. Dokl. AN SSSR 153 no.1:101-103 N '63.
(MIRA 17:1)

1. Institut organicheskoy khimii im. N.D. Zelinskogo AN
SSSR. Predstavleno akademikom B.A. Kazanskim.

KUZNETSOV, Vladimir Ivanovich; EYDUS, Ya.T., doktor khim. nauk,
otv. red.; FEDOROVICH, R.M., red.
[Development of the science of catalysis] Razvitie uche-
niia o katalize. Moskva, Nauka, 1964. 422 p.
(MIRA 17:9)

KIPERMAN, Saveliy L'vovich; EYDYS, Ya.T., doktor khim. nauk,
otv. red.; FEDOROVICH, R.M., red.

[Introduction to the kinetics of heterogeneous catalytic
reactions] Vvedenie v kinetiku geterogennykh katalitiche-
skikh reaktsii. Moskva, Izd-vo "Nauka", 1964. 606 p.
(MIRA 17:7)

EYDUS, Ya. T.; MEPELOV, B. K.; LOBZOVA, A. V.

Catalytic hydrocondensation of carbon monoxide with olefins and their hydropolymerization under the effect of carbon monoxide and hydrogen. Report No. 37: Alkylation of cycloolefins and benzene by means of a mixture of carbon monoxide and hydrogen in the presence of a cobalt-thorium catalyst. Izv AN SSSR Ser Khim no. 4:726-733 Ap '64. (MIRA '7:5)

1. Institut organicheskoy khimii im. N. D. Zelinskogo AN SSSR.

ACCESSION NR: AP4024404

8/0204/64/004/001/0061/0067

AUTHOR: Eydus, Ya. T.; Bulanova, T. F.; Sergeyeva, N. S.

TITLE: The promoting effect of zirconium dioxide on the cobalt catalyst in the synthesis of higher hydrocarbons from carbon monoxide and hydrogen at atmospheric pressure.

SOURCE: Neftekhimiya, v. 4, no. 1, 1964, 61-67

TOPIC TAGS: hydrocarbon synthesis, oxo synthesis, cobalt catalyst, zirconium dioxide, thorium dioxide, promoter, gasoline synthesis, hydrocarbon oil synthesis

ABSTRACT: The promoting effect of ZrO_2 on the cobalt catalyst on a kieselguhr carrier in the synthesis of higher hydrocarbons from CO and H_2 at atmospheric pressure was investigated in view of its similarity to ThO_2 , a known promoter. Of the preliminary catalysts investigated (Co-kieselguhr, Co-kieselguhr with ZrO_2 and Co-MgO-kieselguhr with ZrO_2), the latter, containing MgO proved most active. At 200-240 C after 300 hours operation without regeneration it still yielded 70 gm/m³ of hydrocarbons. Catalysts with various component ratios were examined; the most active found was 100Co:16 ZrO_2 :10MgO:200 kieselguhr. The yield varied

Card 1/2

ACCESSION NR: AP4024404

depending on the length of time the catalyst was used, e.g., after the first 15 hours after catalyst preparation, at 190 C for 170 hours, the yield of higher hydrocarbons was 111-125 gm/m³ with gasoline/oil ratio of 0.55; during the next 400 hours, the yield was 93.3 with 0.9 ratio. A similar catalyst prepared with ThO₂ promotor instead of ZrO₂ yielded, after the first 20 hours, 105 gm/m³ of product with gasoline/oil ratio of 0.45. Orig. art. has: 4 tables and 1 figure.

ASSOCIATION: Institut organicheskoy khimii AN SSSR im. N. D. Zelinskogo
(Institute of Organic Chemistry, AN SSSR)

SUBMITTED: 08Jan63

DATE ACQ: 17Apr64

ENCL: 00

SUB CODE: GC

NO REF SOV: 004

OTHER: 006

Card 2/2

L 56484-65 EPF(c)/ENT(m)/T Pr-4 RM

ACCESSION NR: AP5010563

UR/0204/64/004/005/0763/0766

AUTHOR: Bulanova, T. F.; Eydus, Ya. T.; Sergeyeva, R. S.

TITLE: Promoting action of titanium dioxide on a cobalt catalyst in the reaction of synthesis of higher hydrocarbons at atmospheric pressure from carbon monoxide and hydrogen

SOURCE: Neftekhimiya, v. 4, no. 5, 1964, 763-766

TOPIC TAGS: catalysis, titanium, inorganic oxide, cobalt, hydrocarbon, organic synthetic process

Abstract: Titanium dioxide, like thorium dioxide and zirconium dioxide, was found to have a promoting action on Co-kieselguhr and Co-MgO-kieselguhr catalysts in the reaction of formation of liquid hydrocarbons from carbon monoxide and hydrogen at atmospheric pressure. Catalysts simultaneously containing TiO_2 and MgO were more active than a catalyst containing only TiO_2 . Just as in the case of promotion by ZrO_2 , a catalyst containing 100 Co:6 TiO_2 : 10 MgO:200 kieselguhr proved to be optimum. Orig. art. has 2 tables.

ASSOCIATION: Institut organicheskoy khimii im. N. D. Zelinskogo AN SSSR (Institute of Organic Chemistry, AN SSSR)

SUBMITTED: 07Oct63

ENCL: 00

SUB CODE: OC, GC

NO REF SOV: 005

OTHER: 001

JPES

Card 1/1

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Mechanism of the formation of hydrocarbons with a six-membered cycle in the catalytic hydrocondensation of carbon monoxide with cyclopentene. Dokl. AN SSSR 154 no.5:1139-1141 F'64.

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Synthesis of carboxylic acid derivatives under conditions of acid catalysis from carbon-monoxide, olefins, and acylating compounds. Part 20: Carbomethoxylation of saturated hydrocarbons, donors of hydride ions, with the aid of formic acid and methanol.

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Synthesis of carboxylic acid derivatives by acid catalysis
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19: Hydrocarbomethoxylation of C₅---C₉ olefins with formic
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B

TITLE: Catalytic synthesis of high-molecular hydrocarbons from carbon monoxide and hydrogen in the presence of Co-MgO-kieselguhr catalysts, activated with zirconium or titanium dioxide

SOURCE: Neftekhimiya, v. 5, no. 1, 1965, 68-75

TOPIC TAGS: hydrocarbon synthesis, catalytic hydrogenation, carbon monoxide, hydrogen exchange, cobalt catalyst, magnesium oxide, kieselguhr, zirconium dioxide, titanium dioxide, paraffin synthesis

ABSTRACT: The authors studied the formation of solid paraffins by Fischer-Tropsch synthesis on zirconium- or titanium dioxide activated cobalt-magnesium oxide-kieselguhr catalysts. Catalysts having the composition 200 parts kieselguhr/100 parts Co/6-10 parts ZrO₂ or TiO₂/6-10 parts MgO were obtained by precipitation of nitrates on the kieselguhr support, reduced at 400C and 1 atm. H₂ pressure, and used as catalysts at 10 atm., 100 hr⁻¹ flow rate and a 1:2 ratio of carbon monoxide to H₂, as well as in non-continuous tests and at atmospheric pressure. Synthesis

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